

**Table 2-80: Latitude and Longitude Encoding Values for Data Unavailable and Data Equals ZERO Cases**

Case	Input Latitude (degree)	Input Longitude (degree)	Latitude Coding (binary)	Longitude Coding (binary)	NIC Coding (binary)
1	Unavailable	0.000018	ALL ZEROS	ALL ZEROS	ALL ZEROS
2	0.000055	Unavailable	ALL ZEROS	ALL ZEROS	ALL ZEROS
3	Unavailable	0.000000	ALL ZEROS	ALL ZEROS	ALL ZEROS
4	0.000000	Unavailable	ALL ZEROS	ALL ZEROS	ALL ZEROS
5	Unavailable	Unavailable	ALL ZEROS	ALL ZEROS	ALL ZEROS
6	0.000000	0.000000	ALL ZEROS	ALL ZEROS	<i>NOT ALL ZEROS</i>
7	14.501958489	0.000000	0x0A5000	ALL ZEROS	<i>NOT ALL ZEROS</i>
8	0.000000	-56.250000	ALL ZEROS	0xD80000	<i>NOT ALL ZEROS</i>

#### 2.4.4.5.2.1.2 Verification of Latitude and Longitude for $NAC_P \geq 10$ (§2.2.4.5.2.1 and §2.2.7.2.2)

Appropriate test procedures required to validate the requirements in §2.2.4.5.2.1 are included in §2.4.7.2.2.1 and §2.4.7.2.2.2.

#### 2.4.4.5.2.2 Verification of “ALTITUDE TYPE” Field Encoding (§2.2.4.5.2.2)

##### Purpose/Introduction:

The “ALTITUDE TYPE” field is a 1-bit (bit 8 of byte 10) field used to identify the source of information in the “ALTITUDE” field. The encoding of this field is reflected in [Table 2-13](#).

If the Altitude Type Selection Input is “unavailable” for the “Data Lifetime” value listed for this input in [Table 2-98](#), then the “ALTITUDE TYPE” **shall** default to a value of ZERO if Pressure Altitude is available.

A means **shall** be provided to operationally inhibit the broadcast of Pressure Altitude information, making it unavailable for transmission. ~~A means shall be provided~~If an Altitude Type Selection Input is available, it shall be used to operationally select the preferred ALTITUDE TYPE that is reported if more than one ALTITUDE TYPE is available. ~~If only one ALTITUDE TYPE is available, then that Altitude shall be indicated in the “ALTITUDE TYPE” field~~Altitude source is available, then use of that Altitude shall be reflected in both the “ALTITUDE TYPE” and “ALTITUDE” fields.

If the Altitude Input is “unavailable” for the “Data Lifetime” value listed for this input in [Table 2-98](#), then that Altitude **shall** be deemed unavailable for the purposes of encoding the “ALTITUDE TYPE” field.

##### Measurement Procedure:

##### Step 1: Establish Initial Conditions

Configure the ADS-B/UAT Transmitting System to broadcast UAT Messages by providing valid ~~non-zero~~ altitude information. Verify the following test procedures for the Messages Types according to the capability of the UAT equipage classes.

Step 2: Verify Altitude Type Encoding

Set the ADS-B Transmitting Subsystem to transmit ADS-B Messages.

Operationally select Barometric Pressure Altitude as the Primary Altitude information. Verify that the “ALTITUDE TYPE” field in SV (bit 8 of byte 10) is set to ZERO.

Operationally select Geometric Altitude as the Primary Altitude information. Verify that the “ALTITUDE TYPE” field in SV (bit 8 of byte 10) is set to ONE.

Step 3: Verify Altitude Type Encoding – Selected Altitude Type Information is ~~in~~ Failure Mode Not Available

Set up the ADS-B Transmitting Subsystem to transmit ADS-B Messages. Provide valid ~~non-zero~~ Barometric Pressure Altitude and Geometric Altitude to the UUT.

Operationally select Barometric Pressure Altitude as the Primary Altitude information. Verify that if the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is set to ZERO (0).

Discontinue the input of Barometric Pressure Altitude data to the ADS-B system. Verify that after 2 seconds, Geometric Altitude is reported in “ALTITUDE” subfield of transmitted message and that it is set to the corresponding binary coding value in [Table 2-14](#). Verify that the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is now set to ONE (1).

~~Operationally—Reconnect the Barometric Pressure Altitude data input and operationally~~ select Geometric Altitude as the Primary Altitude information. Verify that the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is set to ONE (1).

Discontinue the input of Geometric Altitude data to the ADS-B system. Verify that after 2 seconds, that the Barometric Pressure Altitude is reported in the “ALTITUDE” subfield of transmitted messages and that it is set to the corresponding binary coding value as described in [Table 2-14](#). Verify that the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is now set to ZERO (0).

Step 4: Verification of Altitude Type Encoding – Altitude Type Data Lifetime

Set up the ADS-B Transmitting Subsystem to transmit ADS-B Messages. Provide valid Barometric Pressure Altitude and Geometric Altitude to the UUT.

Disconnect the input that tells the UUT which Altitude Type was operationally selected. Verify that, after 60 seconds, the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is now set to ZERO (0).

Repeat this step and also discontinue the Barometric Pressure Altitude data when you disconnect input that tells the UUT which Altitude Type was operationally selected. Verify that, after 60 seconds, the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is now set to ONE (1).

**Step 45: Verify Altitude Type Selection – Altitude Broadcast Inhibit Selection**

Set up the ADS-B Transmitting Subsystem to transmit ADS-B Messages. Provide valid ~~non-zero~~ Barometric Pressure Altitude and Geometric Altitude to the UUT.

Operationally inhibit the broadcast of pressure altitude information.

Operationally select the Barometric Pressure Altitude as the Primary Altitude information. Verify the following:

1. The “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is set to ONE (1).
2. The Geometric Altitude is reported in the “ALTITUDE” field.
3. The Barometric Pressure Altitude is reported in the “SECONDARY ALTITUDE” subfield of transmitted messages, and that it is set to ZERO (binary 0000 0000 0000) indicating that data is not available.

Do not operationally inhibit the broadcast of pressure altitude information.

Operationally select the Barometric Pressure Altitude as the Primary Altitude information. Verify that the “ALTITUDE TYPE” field in the State Vector (bit 8 of byte 10) is set to ZERO (0). Verify that the Barometric Pressure Altitude is reported in the “ALTITUDE” subfield of transmitted messages and that it is set to the corresponding binary coding value as described in [Table 2-14](#).

**2.4.4.5.2.3 Verification of “ALTITUDE” Field Encoding (§2.2.4.5.2.3)****Purpose/Introduction:**

The “ALTITUDE” field is a 12-bit (bit 1 of byte 11 through bit 4 of byte 12) field used to encode the altitude of the ADS-B Transmitting Subsystem. The encoding of this field **shall** be as indicated in [Table 2-14](#).

**Measurement Procedure:****Step 1: Establish Initial Conditions**

Configure the ADS-B/UAT Transmitting System to broadcast UAT Messages by providing Altitude information at the nominal update rate. Provide the data externally at the interface to the ADS-B system.

**Step 2: Selection of Primary Altitude Information**

Operationally select Barometric Pressure Altitude as the Primary Altitude information for the following steps (step 3 through step 7) and verify that the “ALTITUDE TYPE” field in (bit 8 of byte 10) is set to ZERO.